



# Polymer- & Soft-Matter-Seminar

Tuesday,  
**16 October**  
2012

at: 5.15 pm

VSP1 1.26  
Von-  
Seckendorff-  
Platz 1,  
06120 Halle

## Dr. Yuriy Zakrevskyy

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### Light-controlled ionic self-assembly: functional materials

The ionic self-assembly (ISA) is one of the strategies in supramolecular chemistry to construct new materials using secondary interactions. Using oppositely charged compound, which can be classified in four large groups: multivalent ions, surfactants, dyes, and poly-electrolytes, [C. F.J. Faul, M. Antonietti, Adv. Mater. (2003)] a broad variety of new structures and functionalities can be realized. However, manipulation of assembly of these tectonic units and the resulting properties remains a big challenge.

In the talk different strategies of light-induced manipulation of the functionalities of ISA complexes as well as the complex formation itself will be presented. Two examples of reversible manipulation of the microgel swelling and DNA compaction processes using photosensitive azobenzene-containing surfactants will be discussed in detail. Binding of the surfactants to oppositely charged microgel particles result to collapse of the latter. The reversible swelling can be realized by UV light irradiation whereas exposure to visible light transforms the complex to the initially collapsed state. The photosensitive surfactant can also be used to reversibly manipulate DNA conformation. Interestingly, driven by strong aggregation effects between azobenzene units, complete DNA compaction takes place when only 20% of its charge is compensated. Optimization of the surfactant structure allows making the process independent on the total concentration.